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Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel International Advanced Level
In Biology (WBI06)

Paper 01 Practical Biology and Investigative Skills

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Introduction

In general, students showed knowledge of the core practical methods. Students clearly identified variables that needed to be controlled but their descriptions as to how the control could be achieved lacked the precision required for this examination. Most students did try to tailor their answers to the given context of each question.

Question 1

1a

This question asked students to describe a suitable method to investigate the effect of temperature on the rate of respiration of mung beans. The dependent variable was only clearly identified by a minority of candidates. In addition, a significant number of candidates did not seem familiar with the use of a respirometer and suggested alternative methods. The control of temperature was frequently not precise. Labelled sketches or diagrams of respirometers did aid the award of marks.

1bi

Many students correctly identified one abiotic and one biotic variable other than the independent variable. A minority of candidates seemed not to distinguish between abiotic and biotic variables, giving answers in the wrong section of the question paper.

1bii

Students were then asked to choose one of the variables they had identified and explain how it could be controlled. Most students selected an appropriate variable with a method of control. Many candidates then went on to describe an effect that it would have on the results that was worthy of credit.

1c

Only a small number of candidates correctly distinguished between aerobic and anaerobic respiration. Only a small number of candidates identified oxygen as the final electron acceptor.

Question 2

The context of this question was the effect of a calcium supplement to the diet of land snails.

2a

Most students wrote a suitable null hypothesis, however, there was a tendency to refer to growth rather than the length of snail shells, so the second mark could not be awarded.

2b

Most students presented the data in a clear table. In a few cases, the full headings from the information given were not included and units were repeated in one or more columns. Some candidates did not distinguish between median and mean.

2c

Most students presented graphs with both axes fully labelled. The plotting was usually easily checked as a sensible scale was chosen in most cases. If a student had identified incorrect medians in part b, they could still be awarded the plotting mark here as an error carried forward. Only a small number of students failed to include any range bars on their graphs.

2d

Most students correctly identified the critical value of 30 from the table and compared this with the calculated value of t .

Some candidates made the mistake of accepting the null hypothesis and suggesting there was no significant difference between the concentration of bile salts and the absorbance.

2e

Most students commented on the limited data available and variability of the raw data. All the other marking points were suggested by at least some candidates.

Question 3

This question was centred around a fieldwork investigation of the effect of the water content of soil on the production of flowers by a plant growing on ridges and in furrows.

3a

Students were asked to identify the possible risks involved in undertaking this fieldwork investigation. Most students gave sensible answers that related to this investigation.

3b

Candidates were asked to describe preliminary work to ensure a proposed method would work. The candidates that had engaged with the context of the investigation gave good descriptions that covered at least three of the points on the mark scheme. Only a small number of answers were only given credit for the idea of practising the method to see if it works.

3c

Nearly all the students described a method of their investigation in a logical sequence. However, a significant number of answers set the investigation in a laboratory context using fixed quantities of water rather than suggesting a method of measuring water content. Suitable variables were identified but, in many cases, they were controlled rather than just being measured or monitored.

3d

Students were asked to explain how the data from their investigation would be recorded, presented and analysed. Most candidates either described or drew tables with headings and graphs with labelled axes. Water content was often stated without any appropriate units. Only a small number of students suggested a statistical test that was not a suitable correlation test.

3e

The students found this question difficult to answer as they may have never carried out an investigation in the field. All the points on the mark scheme were suggested, but only by a minority of candidates.

Advice for students:

- Read the whole question before you start to answer and check that your answer covers everything the question asks for.
- Make sure your answer relates to the specific context of the question.
- When studying Core Practicals, think about what the techniques might be used for and the types of scientific question they might help to answer.
- Carry out every Core Practical for yourself, so you understand how it works and any difficulties that might be encountered.
- If you are given the procedure for a practical technique, put yourself in the shoes of the person writing the procedure: how would they have worked out the details (such as volumes, concentrations and times)? They will have used preliminary practical work.
- Consider the strengths and limitations of each Core Practical technique.
- Practice writing null hypotheses for experiments you carry out, even if you will not necessarily be applying a statistical test.

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